FACE INVESTIGATION

SUBJECT: Farm Worker Electrocuted When Aluminum Grain Tube Contacts Overhead Power Line

SUMMARY:
A 31 year-old male farm worker (the victim) was electrocuted when an aluminum pneumatic grain tube contacted an overhead power line and provided a path for the electric current to the ground where the victim was standing. The victim and the farm owner (the farmer) were attempting to remove a small animal from a 27-foot aluminum pneumatic grain tube that was lying on the ground. The farmer raised one end of the tube while the victim stood near the bottom end of the tube and held a wood-handled pitchfork. There was no indication that the victim was in direct contact with the tube. The elevated end of the tube contacted a 7600 volt overhead power line that extended from the road to the transformer on the power pole. The farmer collapsed and released the tube, which then slid along the power line until it fell to the ground. The farmer remained conscious during the incident, but was stunned and unable to get up for a short time. He saw the victim lying motionless on the ground, and went to provide assistance. He dragged the victim a short distance away, and began to perform cardiopulmonary resuscitation (CPR). After several CPR cycles, he went to a mobile phone and called 911, then resumed CPR. The EMS crew arrived within 8 minutes and took over CPR, and transported the victim to the hospital, where he died. The Wisconsin FACE investigator concluded that, to prevent similar occurrences, farmers should:

- **arrange for underground placement of power lines that are located where equipment could contact energized lines**

- **develop and implement a formal safety program that emphasizes the importance of recognizing and avoiding hazards on farms. These programs should include, but not be limited to, conducting a survey of the farm yard and equipment to identify and remove hazards.**

- **ensure that workers adhere to established safe work procedures and maintain the minimum working distances from energized conductors as described in OSHA standards within the OSHA standard 29 CFR 1910.333 (c) (3) (i).**

- **maintain current training in emergency medical procedures such as cardiopulmonary resuscitation (CPR).**

INTRODUCTION:
On May 11, 1994, a 31-year-old male farm worker was electrocuted when he came in contact with electricity that was transmitted from an overhead power line through an aluminum tube to the ground where he was standing. The Wisconsin FACE investigator learned of the incident from a newspaper article on May 12, 1994. On July 18, 1994, the WI FACE field investigator conducted a visit to the incident site and interviewed the farmer. The investigator obtained copies of the coroner's report, death certificate, sheriff's report and photographs.

The farm property in this incident has been owned by the farmer's family for over 100 years, and provides feed and equipment to the dairy operation that is located at a nearby farm site. The farmer and the victim had

operated the farm with the farmer's father continuously for 12 years. There was no written farm safety policy or safety program. There was no formal training program for the farm workers, and most tasks are learned through on-the-job experience. The victim had worked at the farm part-time during his high school years, then full-time for 12 years.

INVESTIGATION:
On the day of the incident, the victim and the farmer had been performing general farm duties at the farm sites. The incident site includes the farmer's residence, silos, equipment storage buildings, and three grain bins that were clustered around a utility pole. The utility pole held up the overhead power lines that ran from the roadside power lines approximately 200 feet away. An electrician had been working on the utility pole several days before the incident to maintain the electrical equipment for the grain bins, and had moved three aluminum pneumatic grain tubes to the lawn in front of the grain bins and beneath the power lines to provide access to his work area.

Around 1:30 PM, the farmer and the victim drove into the farm driveway and saw a small animal run into one of the 6-inch diameter grain tubes. They decided to remove the animal from the 27-foot long pipe by raising an end of the tube to force it to slide out. The farmer raised one end of the grain tube while the victim stood near the bottom end of the tube and held a wood-handled pitchfork. There was no indication that the victim was in direct contact with the tube. The elevated end of the tube contacted a 7600 volt overhead power line that extended from the road to the transformer on the power pole. The farmer collapsed and released the tube, which then slid along the power line until it fell to the ground. The farmer remained conscious during the incident, but was stunned and unable to get up for a short time. After he recovered, he saw the victim lying motionless on the ground, and went to provide assistance. He dragged the victim a short distance away, and began to perform cardiopulmonary resuscitation (CPR). After several CPR cycles, he went to a mobile phone and called 911, then resumed cardiopulmonary resuscitation (CPR). The EMS crew arrived within 8 minutes and took over CPR, and transported the victim to the hospital, where he died.

The farmer was burned on his right arm, both hands, and right foot. He was transported to a hospital, and was released the same day. A deep burn mark is located on the grain tube 21 feet from the bottom end of the tube, and multiple lighter burn marks are present on the top 6 feet of the tube. A burned imprint of the victims's right shoe was visible at the site where he was standing at the time of the incident, within several inches of a semicircular burn mark from the end of the grain tube. There were also burned imprints of the farmer's shoes at the place he was standing. Both the victim and the farmer were each wearing leather-soled shoes, however the soles of the victim's shoes were separated from the shoe tops near the toes. There was no apparent damage to the pitchfork, and the animal was not located after the incident.

CAUSE OF DEATH:
The coroner reported the cause of death as electrocution with trauma arrest. The coroner's report also noted the victim had burn marks on the tops and bottoms of both feet, and on his great toes.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Farmers should arrange for underground placement of power lines that are located where equipment could contact energized lines.

Discussion: Power lines should be buried when they are in an area where farmers may be moving or erecting equipment that could contact the lines. At the site of this incident, the elevated power lines ran from the road to a power pole located within a cluster of grain bins, and pneumatic grain tubes were temporarily placed beneath the elevated power line. At the time of the on-site visit, the power lines had been placed underground by the power company.

Recommendation #2: Farmers should develop and implement a formal safety program that emphasizes the importance of recognizing and avoiding hazards on farms. These programs should include, but not be limited to, conducting a survey of the farm yard and equipment to identify and remove hazards.

Discussion: In this incident, a safety survey might have identified the hazard of storing and raising long metal tubes in the vicinity of overhead power lines.

Recommendation #3: Farmers should ensure that workers adhere to established safe work procedures and maintain the minimum working distances from energized conductors as described within the OSHA standard 29 CFR 1910.333 (c) (3) (i).

Discussion: The OSHA standard establishes "when an unqualified person is working on the ground in the vicinity of overhead lines, the person may not bring any conductive object closer to unguarded, energized overhead lines than the following distances:

(1) For voltages to ground 50 kV or below - 10 ft. (305 cm);
(2) For voltages to ground over 50kV - 10 ft. (305 cm) plus 4 in. (10 cm) for every 10 kV over 50 kV.
Although this farm situation does not come under OSHA jurisdiction, farmers should implement these standards when working near energized overhear power lines.

Recommendation #4: Farmers and farm workers should maintain current training in emergency medical procedures such as cardiopulmonary resuscitation.

Discussion: Farmers and farm workers frequently work in isolated and hazardous conditions. When an injury occurs, fatalities may be prevented by prompt emergency medical care, such as CPR and first aid for burns. The farmer in this incident received CPR training several years ago, and was able to initiate the procedure immediately after the victim was injured.